

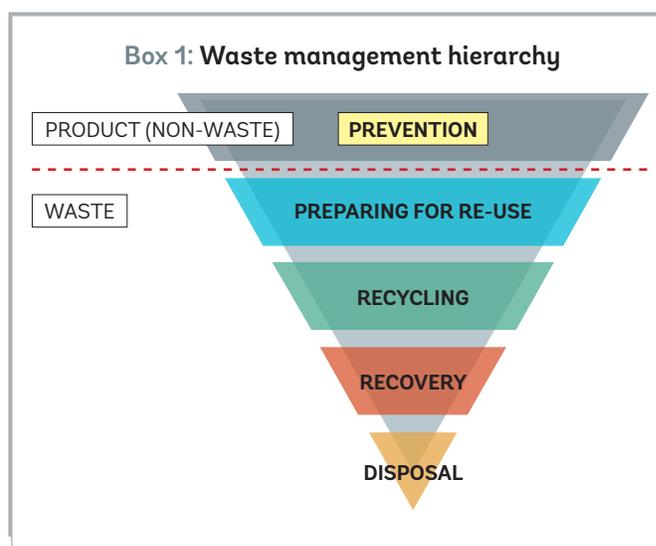
Management of Municipal Solid Waste:

Approaches and Practices within the World Bank¹

Background

1 Overall approach: The development of a waste management system, from where waste management is minimal to sustainable resource management, can be considered in terms of three key steps: (1) establishing waste collection services to protect public health; (2) improving waste treatment and disposal to provide environmental protection; and (3) implementing systems and incentives to enable the transition to sustainable resource management (based on Wilson, 2007²).

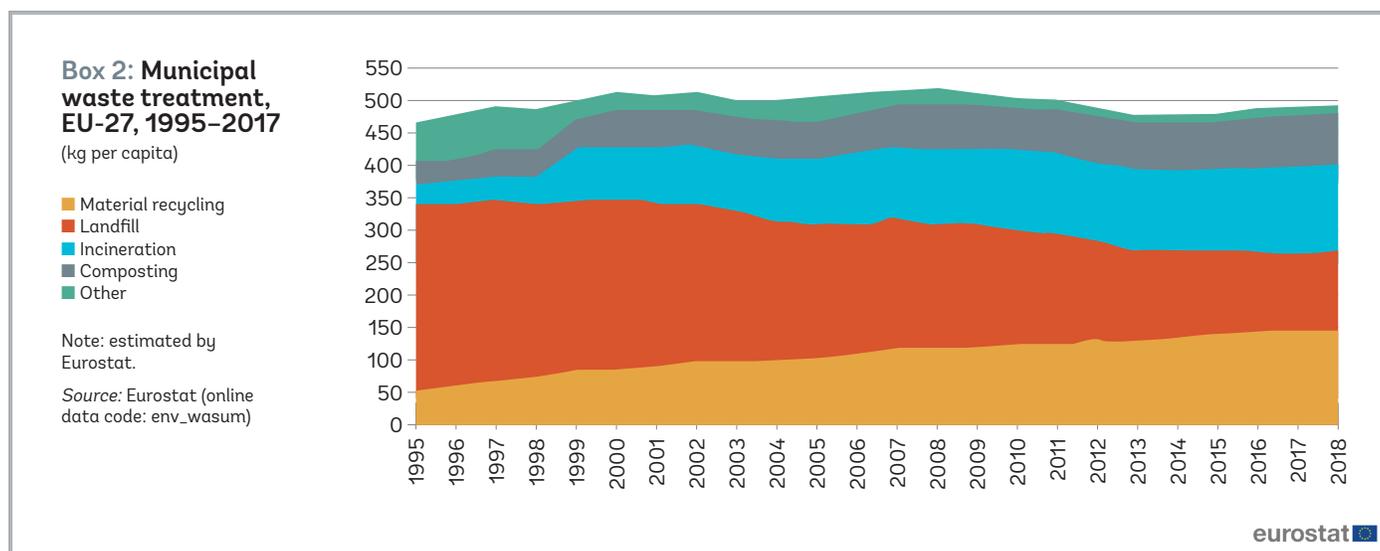
2 The Waste Hierarchy principle: The waste management hierarchy principle has been widely adopted internationally to guide the management of wastes. Moving up the waste hierarchy implies re-introduction of material resources into the economy and prevent waste from being generated. Resulting policies promote waste prevention, reuse, recycling, material and energy recovery, in this order, over waste disposal (Box 1). The circular economy concept builds upon the waste management hierarchy principle and is an expression of an economic model that highlights business opportunities in the management of waste with circular loops rather than linear processes. It aims towards maintaining the value of products and materials for as long as possible.



3 Waste treatment mix: Countries that have adopted and follow the waste hierarchy principle and the circular economy concept, such as countries of the European Union (EU), have introduced a comprehensive set of regulations and economic instruments that stimulate the implementation of policies underpinned by, *inter alia*: (a) elevated waste tariffs that cover the costs of treatment, (b) significant communication campaigns to secure public participation and compliance, and (c) strict enforcement. As a result of these efforts, the treatment

¹ This note, prepared by the Solid Waste Management Community of Practice within the World Bank Group, is intended to provide quick guidance to World Bank clients, technical staff and consultants engaged with the design, preparation and implementation of waste management projects and related activities. It is based on internationally accepted principles and good practices for waste management and is anchored within the World Bank Group's General Environmental, Health and Safety (EHS) Guidelines. The note is not intended to be a comprehensive guide and should be applied in conjunction with other available large body of sectoral knowledge and materials.

² Wilson D., Development Drivers for Waste Management (2007)



mix in these countries has evolved over time: recycling, combustion and composting have been increasing while landfilling has been decreasing (Box 2). Performance among countries is highly mixed with Northern Europe having the highest recycling rates with a maximum of 67% (Germany) and much lower rates among new EU member states to a minimum of 11% (Romania)³. On average for the EU, about a quarter of the waste is still landfilled. Going forward, recycling rates including composting are expected to increase due to recent measures under the Circular Economy Action Plan⁴, while combustion and disposal are expected to decrease; however, since combustion and disposal will remain necessary outlets for residual mixed waste with no other treatment option, they will not completely phase out.

4 Financial cost: Moving up the waste hierarchy as observed in the EU, Japan, Korea, Singapore and other countries with advanced waste treatment systems is expensive. Cost of solid waste management activities in the highest performing countries in Europe can go up to US\$350/tonne for waste treated, compared to US\$20-100/tonne in low and middle-income countries where landfills are predominant. Costs in Europe are expected to continue to climb to meet the increasingly ambitious policy objectives of the Circular Economy Action Plan, including a common EU target of recycling 65% of municipal waste by 2035⁵. In low and middle-income countries, most of

the recycling is done informally. Informal recycling, which is based on revenues that can be directly extracted from waste sales and thus focusing on higher end/more valuable recyclables, is generally thought to achieve recycling rates of up to 10-15% of total volumes generated. Better organized waste management structures with adequate funding for basic collection and disposal can increase the recycling rate, to roughly 20-25 percent (by volume) without excessive costs; beyond this range of recycling, financing and system requirements become exponentially more challenging. In some places and specific contexts, higher percentages of recycling may be reachable without significant tariff increases, such as with very high community participation and volunteer efforts. These community-led schemes however are challenging to replicate, especially not in large cities.

5 Affordability: Waste management is a budget intensive activity. Donor and government support to local governments are generally focused on capital costs for infrastructure and equipment and technical support to mobilize user fees, whereas local governments typically finance operating costs. A commonly used benchmark for assessing affordability is that user fees should not exceed 1 to 1.5 percent of disposable income. High-income countries typically remain below that threshold even though the cost of their systems is higher. In contracts, in low-income countries, costs even for basic systems -

³ Eurostat 2018 (https://ec.europa.eu/eurostat/web/products-datasets/product?code=sdg_11_60)

⁴ https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf

⁵ Official Journal of the European Union, L 150, 14 June 2018

collection, partial recycling, disposal, often exceed that threshold. In low-income countries, fewer citizens paying user fees and the collection rates of the user fees also tends to be lower. Insufficient financing is one of the main challenges to developing an even basic waste management system.

6 Social contract and compliance enforcement: Moving up the waste management hierarchy requires: (a) a strong social contract with generators such as the public and industries, which in the case of Europe, Korea and other countries with advanced waste management systems has taken decades to develop; (b) a strong regulatory environment; and (c) strict enforcement. Low-income countries have yet to reach full safe disposal of their waste and

position their sectors fully within the waste management hierarchy. In many low-income countries, large volumes of waste continue to be littered and improperly disposed without environmental and social protection measures in place. Moreover, in low-income countries, there tends to be an overall lack of systems for the adequate provision of solid waste management services, including understanding of the sector, availability of public or private sector providers with suitable capacity, adequate infrastructure and a financially sustainable system for service provision. The immediate objective in such environments is to establish waste collection services to protect public health and identify affordable, environmentally safe outlets for the collected waste.

Approaches and Practices within the World Bank

7 The World Bank Group's General Environmental, Health and Safety (EHS) Guidelines for non-hazardous (including household) waste envisage the application of the waste management hierarchy, where:

- *If waste materials are still generated after the implementation of feasible waste prevention, reduction, reuse, recovery and recycling measures, waste materials should be treated and disposed of and all measures should be taken to avoid potential impacts to human health and the environment.*
- *Selected management approaches should be consistent with the characteristics of the waste and local regulations, and may include [...] on-site or off-site biological, chemical, or physical treatment of the waste material to render it nonhazardous prior to final disposal, and treatment or disposal at permitted facilities specially designed to receive the waste. Examples include: composting operations for organic non-hazardous wastes; properly designed, permitted and operated landfills or incinerators designed for the respective type of waste; or other methods known to be effective in the safe, final disposal of waste materials such as bioremediation.*

8 World Bank Group assistance in waste management: The World Bank assists countries to develop and implement approaches consistent with the above principles, in support of national waste management strategies, while being cognizant of in-country conditions. Given that many of the Bank client countries lack waste collection and safe disposal methods, Bank projects typically include assistance with collection, transportation, recycling, composting, recovery and disposal, along with technical assistance. There is often a strong focus on addressing key challenges of the sector requiring behavior change such as waste prevention, source separation, and cost recovery, all of which allow for a more sustainable system. The Bank also plays a key role in assisting countries to adopt and implement waste management regulations and policies built around the waste management hierarchy, as well as capacity building of decision makers. Since waste management interacts with other municipal services such as stormwater management and wastewater/sludge management, integrated urban municipal services projects often explore synergies in impacts and the positive potential for aligning sector operations.

9 Transitioning upwards in the waste management hierarchy in low and middle-income countries is bound to follow a gradual approach and is unrealistic to take place in a short timeframe given the required comprehensive

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legal and regulatory environment, substantial public participation and high costs. At the lower end of the hierarchy - landfilling has been practiced for many years and is an established disposal method in environmentally cautious economies in Europe, Asia and the Americas. Landfills can be constructed in locations where sites already exist or can be made available, and can be operated according to international standards. They remain one of the most financially accessible solutions that is environmentally acceptable, especially in countries where land is available at a reasonable cost. At the same time, waste management systems should aim to start including, where feasible, more advanced solutions. In highly urbanized, fast growing cities where land availability, cost, and logistical or political considerations make a landfill prohibitively expensive, energy from waste (EfW) solutions can be considered. However, affordability issues of cities and their constituents, cost recovery mechanisms, and revenue models to support private solutions, as well as other factors need to be weighed. Typically, private sector based EfW solutions are more likely to be considered and found viable in middle-income countries. Similar to landfilling, EfW solutions can co-exist and encourage

other waste treatment that is higher in the waste hierarchy such as recycling, if facilities are sized correctly. Material recycling is the next step up in the waste hierarchy and essential for resource conservation and resource efficiency. Separation at source must be explored and supported as much as feasible given country circumstances and be prioritized as soon as the basic requirements for community health, safety and environment have been accomplished.

10 Inadequate solid waste management systems pose serious health, social and environmental costs at the local and global levels, including air pollution, water contamination, human health impacts (particularly on the most socially vulnerable), and the greenhouse gas emissions impact on climate change. While the World Bank Group partners with countries on a long-term path towards sustainable waste management solutions, it recognizes the immense and urgent challenges posed by inadequate systems in place today, and thus the urgency to intervene and support the gradual development of the waste management sector.

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